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Search for neutron decay into an antineutrino and a neutral kaon in Super-Kamiokande

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Some models in supersymmetric grand unified theories (SUSY GUTs) predict baryon number violating neutron decay into an antineutrino and a neutral kaon ($n \to \bar{\nu}K^0$). In this presentation, we report on a search for this neutron decay mode using 0.401 megaton·years of data collected by the Super-Kamiokande detector, which corresponds to 4.4 times the exposure of the previous analysis. The sensitivity has been improved by enhancing the momentum reconstruction of charged pions from K^0 decays and performing a fit to the invariant mass distributions. No statistically significant signal excess above the expected background was observed. Consequently, a lower limit on the partial lifetime was set at 7.8×10^{32} years at a 90% confidence level, which improves upon the previous limit by a factor of six. This result places the most stringent constraint on the $n \to \bar{\nu}K^0$ decay mode to date.

Collaboration you are representing

Super-Kamiokande

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